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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/632,080	NAKAMURA ET AL.	
	Examiner	Art Unit	
	DANIEL ZEILBERGER	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment.is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/27/04, 9/01/05, 1/12/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. **Claim 19** is objected to under 37 CFR 1.75(a), as failing to conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery. In particular, claim 19 recites a "comprising circuit", wherein it is unclear what a "comprising circuit" is. Appropriate correction is required, however for the purposes of examination, it will be assumed that a "comprising circuit" is a circuit.

2. **Claim 20** is objected to under 37 CFR 1.75(a), as failing to conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery. In particular, claim 20 recites "the comparing circuit", however there is no "comparing circuit" to provide proper antecedent basis for "the comparing circuit" in claim 20 or any claim upon which claim 20 depends. Appropriate correction is required, however for the purposes of examination, it will be assumed that "the comparing circuit" is referring to "a comprising circuit" in claim 19, and thus it will also be assumed for the purposes of examination that "the comparing circuit" is a circuit.

3. **Claim 36** is objected to under 37 CFR 1.75(a), as failing to conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery. In particular, 39 lacks proper antecedent basis for claimed "conductive member" in line 1 of the claim. Appropriate correction is required,

however for the purposes of examination it will be assumed that "the second detection electrode" is --a conductive member--.

4. **Claim 39** is objected to under 37 CFR 1.75(a), as failing to conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery. In particular, 39 lacks proper antecedent basis for claimed "the second detection electrode" in line 8 of the claim. Appropriate correction is required, however for the purposes of examination it will be assumed that "the second detection electrode" is --a second detection electrode--.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. **Claim 29** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Particularly, while being enabling for some time constants less than 0.3 μ sec, the specification does not reasonably provide enablement for all time constants less than 0.3 μ sec, such as 0 μ sec.

7. **Claim 32** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not

described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Particularly, while being enabling for some time constants less than 0.25 μ sec, the specification does not reasonably provide enablement for all time constants less than 0.3 μ sec, such as 0 μ sec.

8. **Claim 33** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Particularly, while being enabling for some resistance values less then 30 ohms, the specification does not reasonably provide enablement for resistance values less then 30 ohms, such as 0 ohms.

9. **Claim 34** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Particularly, while being enabling for some capacitance values less than 10 nF, the specification does not reasonably provide enablement for all capacitance values less than 10 nF, such as 0 nF.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. **Claim 5** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Particularly, claim 5 states that the first detection electrode is a transparent conductive film formed on the upper portion of a light receiving surface of at least the sensor array *through the interlayer insulating film*. However, it is unclear how the first detection electrode is formed "through the interlayer insulating film". For the purposes of examination, it will be assumed that the light which is received by the "light receiving surface" passes through the interlayer insulating film, and not that the first detection electrode is formed "through the interlayer insulating film".

12. **Claim 13** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Particularly, claim 13 claims a "periodical pulse-like signal waveform". However, it is unclear what variety of signal waveforms a "pulse-like signal waveform" entails. Appropriate correction is required, however for the purposes of examination it will be assumed that a "periodical pulse-like signal waveform" is any signal which repeatedly has a signal level that rises and falls.

13. **Claim 35** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Particularly, claim 35 states that the first detection electrode is a transparent electrode film formed on the upper portion of the light receiving surface of the sensor array *through the interlayer insulating film*. However, it is unclear how the first detection electrode is formed "through the interlayer insulating film". For the

purposes of examination, it will be assumed that the light which is received by the "light receiving surface" passes through the interlayer insulating film, and not that the first detection electrode is formed "through the interlayer insulating film".

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. *Claims 1-28, 39-44* are rejected under 35 U.S.C. 103(a) as being unpatentable over Morikawa et al. (US Patent Application Publication 2001/0030324) in view of Setlak et al. (US 5,828,773), hereinafter referenced as Morikawa and Setlak respectively.

Regarding **claim 1**, Morikawa discloses an image reading apparatus (see paragraph 244), comprising:

a detecting surface on which a detecting object is placed (see paragraph 277 and figure 43, wherein a finger comes into contact with the electrostatic electricity discharging and contact sensing electrode 31);

a sensor array having a plurality of sensors arranged to read an image pattern of the detecting object placed on the detecting surface (see paragraph 275);

a first detection electrode, provided on at least an upper portion of the sensor array, having the detecting surface (see electrode 31a in paragraph 276 and figure 43);

a second detection electrode provided to be electrically insulated and spaced from the first detection electrode (see electrode 31b in paragraph 276 and figure 43);

contact detector which determines whether the detecting object brought into contact with the detecting surface is a specific detecting object based on a third signal waveform excited to the second detection electrode according to contact of the detecting object with both the first detection electrode and the second electrode (see paragraph 281).

Morikawa fails to disclose "a counter electrode provided to be opposite to the first detection electrode through an interlayer insulating film; signal voltage applying circuit which applies a signal voltage having a first signal waveform that varies periodically to the counter electrode to excite a second signal waveform to the first detection electrode through the interlayer insulating film". However, the examiner maintains that it was obvious at the time of the invention, as taught by Setlak, to provide:

a counter electrode provided to be opposite to the first detection electrode through an interlayer insulating film (see drive electrode layer 71 in column 6 lines 38-39, 46-48);

signal voltage applying circuit which applies a signal voltage having a first signal waveform that varies periodically to the counter electrode to excite a second signal waveform to the first detection electrode through the interlayer insulating film (see excitation drive amplifier 74 in column 6 lines 38-42, and the first electric field in column 6 line 66 through column 7 line 1 and figure 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Morikawa, by specifically providing "a counter electrode provided to be opposite to the first detection electrode through an interlayer insulating film; signal voltage applying circuit which applies a signal voltage having a first signal waveform that varies periodically to the counter electrode to excite a second signal waveform to the first detection electrode through the interlayer insulating film", as taught by Setlak, for the purpose of obtaining an output signal that varies according to the distance between the finger and the electrode on the surface of the sensor (first detection electrode) using a capacitive voltage divider in order to prevent spoofing of the device with an object that does not have the same capacitive characteristics as finger skin (see column 7 lines 3-12).

Regarding **claim 2**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. In the embodiment discussed above Morikawa fails to disclose claimed "drive controller which supplies a predetermined drive control signal to each sensor of the sensor array to perform an image reading operation of the

image pattern of the detecting object placed on the detecting surface". However, in another embodiment Morikawa discloses:

drive controller which supplies a predetermined drive control signal to each sensor of the sensor array to perform an image reading operation of the image pattern of the detecting object placed on the detecting surface (see controller 160 in paragraph 203).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art to modify the combination of Morikawa and Setlak, by specifically providing claimed "drive controller which supplies a predetermined drive control signal to each sensor of the sensor array to perform an image reading operation of the image pattern of the detecting object placed on the detecting surface", for the purpose of creating fingerprint image data.

Regarding **claim 3**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 2. In addition, Morikawa discloses:

wherein the drive controller controls the image reading operation based on the determination result of whether the detecting object is the specific detecting object by the contact detector (see photography start signal in paragraph 281).

Regarding **claim 4**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. In addition, Morikawa discloses wherein each sensor of the sensor array is a photosensor (see paragraphs 244 and 245).

In the embodiment discussed above Morikawa fails to disclose claimed "the first detection electrode and interlayer insulating film have transmittance". However, in another embodiment Morikawa discloses:

the first detection electrode and interlayer insulating film have transmittance (see paragraphs 134 and 194).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art to modify the combination of Morikawa and Setlak, by specifically providing claimed "the first detection electrode and interlayer insulating film have transmittance", for the purpose of allowing light to pass through the insulating film 30 and the contact sensing electrode 31 in order to allow a fingerprint to be imaged onto the photosensors.

Regarding **claim 5**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 4. In addition, Morikawa discloses:

wherein the first detection electrode is a transparent conductive film formed on the upper portion of a light receiving surface of at least the sensor array through the interlayer insulating film (see paragraph 276 in regards to electrode 31a made of indium tin oxide).

Regarding **claim 6**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 5. In addition, Morikawa discloses:

wherein the transparent conductive film is formed of material principally of indium-tin oxide (see paragraph 276).

Regarding **claim 7**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. In addition, Morikawa discloses:
wherein the first detection electrode is a conductive film formed on the upper portion of the sensor army, and the second detection electrode is conductive member formed close to at least a part of the surrounding of the conductive film (see paragraph 276 and figure 43).

Regarding **claim 8**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 7. In addition, Morikawa discloses:
wherein the conductive member is a conductive case member that surrounds around the sensor array (see paragraph 286 in regards to figure 47, wherein electrode 31a is formed so as to cover the entire surface of the sensor area Aa so that the finger comes into contact with the electrode 31a without fail when the electrode 31a is placed on the photosensor device 12, and as can be seen in figure 47 electrode 31b is on the surrounding area of the photosensor array).

Regarding **claim 9**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. In addition, Morikawa discloses:

wherein the specific detecting object is a human body, and the image pattern peculiar to the relevant human is read (see finger in paragraph 272 and fingerprint in paragraph 275).

Regarding **claim 10**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. In addition, Morikawa discloses: wherein the detecting object is arranged to be laid across the first detection electrode and the second detection electrode to be brought into contact therewith (see paragraph 277, wherein the contact detector 170 detects that the finger comes into contact with the electrostatic electricity discharging and contact sensing electrode 31, wherein the finger is arranged on the predetermined photography position).

Regarding **claim 11**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. In addition, Morikawa discloses: amplitude limiting circuit which defines the upper and lower limit voltage values of the second signal waveform excited to the first detection electrode (see diode circuit 151 in paragraphs 283-285).

Regarding **claim 12**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 11. In addition, Morikawa discloses: wherein the amplitude limiting circuit includes at least an anti-pamUel diode circuit provided between the first detection electrode and a ground potential, and defines the upper and lower limit voltage values of the second signal waveform excited to the first

detection electrode based on forward voltages of the respective diodes that form the anti-parallel diode circuit (see diode circuit 151 in paragraphs 283-285).

Regarding **claim 13**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. While the combination as disclosed above does not disclose "wherein the signal voltage applying circuit applies a voltage component having a periodical pulse-like signal waveform with predetermined voltage amplitude to the counter electrode", the examiner maintains that it would have been obvious to one of ordinary skill in the art to provide:
wherein the signal voltage applying circuit applies a voltage component having a periodical pulse-like signal waveform with predetermined voltage amplitude to the counter electrode (see paragraph 278 of Morikawa, wherein it is disclosed that an alternating current signal is supplied to the wiring L1 which goes to the electrode 31a, wherein the alternating current signal is inherently periodical and pulse-like and further wherein it would be obvious to one of ordinary skill in the art for the signal to have a predetermined current signal so that analysis can be done on the signal, wherein it was discussed above that it would have been obvious in view of Setlak to apply this signal to an electrode opposite the electrode on the surface of the array instead of directly to the electrode on the surface).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art to modify the combination of Morikawa and Setlak, by specifically providing claimed "wherein the signal voltage applying circuit applies a voltage

component having a periodical pulse-like signal waveform with predetermined voltage amplitude to the counter electrode", for the purpose of applying a signal to the electrode on the surface of the array that can result in an output signal that can have anticipated results.

Regarding **claim 14**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. Morikawa fails to specifically disclose claimed "wherein the contact detector determines whether the detecting object is the specific detecting object based on a value of voltage amplitude and a value of central voltage of the voltage amplitude of the third signal waveform excited to the second detection electrode". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:
wherein the contact detector determines whether the detecting object is the specific detecting object based on a value of voltage amplitude and a value of central voltage of the voltage amplitude of the third signal waveform excited to the second detection electrode (see paragraph 281, wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious to one of ordinary skill in the art that to detect a change in the level of the detection signal, the amplitude of the detection signal and the central value of the detection signal would be needed).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically

providing "wherein the contact detector determines whether the detecting object is the specific detecting object based on a value of voltage amplitude and a value of central voltage of the voltage amplitude of the third signal waveform excited to the second detection electrode", for the purpose of determining a change in the level of the detection signal so that it can be determined that a finger is between electrodes 31a and 31b.

Regarding **claim 15**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. Morikawa fails to specifically disclose claimed "wherein the contact detector determines whether the detecting object is the specific detecting object based on comparison between threshold voltage preset based on a capacitance component and a resistance component of the specific detecting object and the third signal waveform excited to the second detection electrode". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:
wherein the contact detector determines whether the detecting object is the specific detecting object based on comparison between threshold voltage preset based on a capacitance component and a resistance component of the specific detecting object and the third signal waveform excited to the second detection electrode (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in impedance resulting from the resistance value or capacity value by the human body including the finger, wherein this change is

determined from a change in the level of the detection signal, wherein it would be obvious to one of ordinary skill in the art that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein since Morikawa discloses that a change in impedance based on the resistance value or capacity value of the finger is detected, it would be obvious that the reference threshold value is based on this resistance value or capacity value).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the contact detector determines whether the detecting object is the specific detecting object based on comparison between threshold voltage preset based on a capacitance component and a resistance component of the specific detecting object and the third signal waveform excited to the second detection electrode", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 16**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 15. Morikawa fails to specifically disclose claimed "wherein the contact detector determines that the detecting object is the specific detecting object when the threshold voltage is included within a range of the voltage amplitude of the third signal waveform excited to the second detection electrode". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the contact detector determines that the detecting object is the specific detecting object when the threshold voltage is included within a range of the voltage amplitude of the third signal waveform excited to the second detection electrode (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the reference signal value and the current signal value must be at least some amount, wherein this amount would at least fall within the range of the detection signal).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the contact detector determines that the detecting object is the specific detecting object when the threshold voltage is included within a range of the voltage amplitude of the third signal waveform excited to the second detection electrode", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 17**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 15. Morikawa fails to specifically disclose claimed "wherein the threshold voltage is set to voltage higher than the upper limit value of the third signal waveform excited to the second detection electrode in a

state that at least the detecting object comes in no contact with the detecting surface". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the threshold voltage is set to voltage higher than the upper limit value of the third signal waveform excited to the second detection electrode in a state that at least the detecting object comes in no contact with the detecting surface (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the reference signal value and the current signal value must be at least some amount, wherein it would be obvious that in order to determine between the two cases of finger presence and no finger presence, the difference from the threshold must be greater than the maximum signal value when no finger is present).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the threshold voltage is set to voltage higher than the upper limit value of the third signal waveform excited to the second detection electrode in a state that at least the detecting object comes in no contact with the detecting surface", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 18**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 15. Morikawa fails to specifically disclose claimed "wherein the threshold voltage is set to voltage lower than the lower limit value of the third signal waveform excited to the second detection electrode in a state that at least the detecting object comes in no contact with the detecting surface". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:
wherein the threshold voltage is set to voltage lower than the lower limit value of the third signal waveform excited to the second detection electrode in a state that at least the detecting object comes in no contact with the detecting surface (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the reference signal value and the current signal value must be at least some amount, wherein it would be obvious that in order to determine between the two cases of finger presence and no finger presence, the difference from the threshold must be greater than the minimum signal value when no finger is present).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the threshold voltage is set to voltage lower than the lower limit value of the third signal waveform excited to the second detection electrode in a state that at

least the detecting object comes in no contact with the detecting surface", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 19**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 15. Morikawa fails to specifically disclose claimed "wherein the contact detector includes at least a threshold voltage setting circuit that sets the threshold voltage, and a comprising circuit that compares the threshold voltage and the third signal waveform". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the contact detector includes at least a threshold voltage setting circuit that sets the threshold voltage, and a comprising circuit that compares the threshold voltage and the third signal waveform (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that some circuit would need to set this threshold signal value, wherein it would be obvious that in order to determine a change in the level of the detection signal, a circuit would be need to compare the threshold signal value and the current signal value).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically

providing "wherein the contact detector includes at least a threshold voltage setting circuit that sets the threshold voltage, and a comprising circuit that compares the threshold voltage and the third signal waveform", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 20**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 19. Morikawa fails to specifically disclose claimed "wherein the contact detector determines whether the threshold voltage is included in the range of the voltage amplitude of the third signal waveform based on the comparison result by the comparing circuit, and outputs a contact detection signal indicating that the detecting object is the specific detecting object when it is determined that the threshold voltage is included in the range of the voltage amplitude of the third signal waveform". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the contact detector determines whether the threshold voltage is included in the range of the voltage amplitude of the third signal waveform based on the comparison result by the comparing circuit (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the

reference signal value and the current signal value must be at least some amount, wherein this amount would at least fall within the range of the detection signal, wherein it would be obvious that this comparison would be done by a circuit);
outputs a contact detection signal indicating that the detecting object is the specific detecting object when it is determined that the threshold voltage is included in the range of the voltage amplitude of the third signal waveform (see paragraph 281, wherein it is disclosed that when it is detected that a finger has come into contact with the electrode 31, the contact detector 170 outputs the photography start signal to the controller 160)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the contact detector determines whether the threshold voltage is included in the range of the voltage amplitude of the third signal waveform based on the comparison result by the comparing circuit, and outputs a contact detection signal indicating that the detecting object is the specific detecting object when it is determined that the threshold voltage is included in the range of the voltage amplitude of the third signal waveform", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 21**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 19. Morikawa fails to specifically disclose claimed "wherein the third signal waveform is a waveform that varies periodically, and the contact detector includes means for detecting whether the third

signal waveform has passed the threshold voltage level, and count circuit which counts the number of times the third signal waveform has passed the threshold voltage level, and outputs a contact detection signal indicating that the detecting object is the specific detecting object when the number of continuous count times by the count circuit exceeds the preset number of times". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the third signal waveform is a waveform that varies periodically (see paragraph 278, an alternating current signal is supplied to the electrode 31a which inherently is periodical, wherein since the third signal waveform is the signal after it travels through the finger and into the electrode 31b, it will obviously still be periodical);

the contact detector includes means for detecting whether the third signal waveform has passed the threshold voltage level (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the reference signal value and the current signal value must be at least some amount);

count circuit which counts the number of times the third signal waveform has passed the threshold voltage level, and outputs a contact detection signal indicating that the detecting object is the specific detecting object when the number of continuous count times by the count circuit exceeds the preset number of times (see paragraph 281,

wherein since the contact detection 170 detects when a change in the level of the detection signal occurs, in order to detected that a finger has come into contact with the electrode 31, the contact detector 170 outputs the photography start signal to the controller 160, the contact detector necessarily detects at least 1 occurrence of a change in signal level)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the third signal waveform is a waveform that varies periodically, and the contact detector includes means for detecting whether the third signal waveform has passed the threshold voltage level, and count circuit which counts the number of times the third signal waveform has passed the threshold voltage level, and outputs a contact detection signal indicating that the detecting object is the specific detecting object when the number of continuous count times by the count circuit exceeds the preset number of times", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 22**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. In the embodiment discussed above Morikawa fails to disclose the limitations of claim 22. However, in another embodiment Morikawa discloses:

wherein the sensors are photosensors, have a source electrode and a drain electrode that are formed to sandwich a channel area formed of a semiconductor layer, and a first gate electrode and a second gate electrode that are formed on at least upper and lower

portions of the channel area through each gate insulating film (see paragraphs 143-145, wherein is disclosed a plurality of photosensors, source electrode 27b, drain electrodes 27a and 27c opposite source electrode 27b sandwiching each of the semiconductor layers 24a and 24b, and single top gate electrode 29 formed above the semiconductor layers 24a and 24b via top gate insulating film 28 and single bottom gate electrode 22 formed below the semiconductor layers 24a and 24b via the bottom gate insulating film 23);

a reset pulse is applied to the first gate electrode to initialize the sensors (see paragraph 117);

a precharge pulse is applied to the drain electrode (see paragraph 119);

thereafter a read pulse is applied to the second gate (see paragraph 120);

thereby electrical charge corresponding to the amount of irradiated light is stored in the channel area for charge storing time, which is from the end of initialization to application of the read pulse (see paragraphs 118 and 123);

voltage corresponding to the amount of stored charges as output voltage is output to the channel area (see paragraph 118);

the image pattern of the detecting object placed on the detecting surface is read based on a difference between signal voltage according to the precharge pulse and the output voltage (see paragraph 123 and figure 11, where it can be seen that the voltage VD will be a difference between the precharge voltage Vpg and a change in voltage due to light accumulation).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art to modify the combination of Morikawa and Setlak, by specifically providing the limitations of claim 22, for the purpose of reading an image from the photosensors.

Regarding **claim 23**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. In the embodiment discussed above Morikawa fails to disclose claimed "wherein the sensors are formed on an insulating substrate having transmittance, a protection insulating film is formed on a side opposite to the insulating substrate of the sensors, and the interlayer insulating film includes the protection insulating film and the gate insulating film". However, in another embodiment Morikawa discloses:

wherein the sensors are formed on an insulating substrate having transmittance (see paragraph 127, wherein it is disclosed that photosensor 10 is formed on a transparent insulating substrate 21);

a protection insulating film is formed on a side opposite to the insulating substrate of the sensors (see protection insulating film 30 in paragraph 246 and figure 38);

the interlayer insulating film includes the protection insulating film and the gate insulating film (see paragraph 246 and figure 38, wherein the protection insulating film 30 and the gate insulating films 23 and 28 are located between the electrostatic electricity discharging and contact sensing electrode 31 and the transparent insulating substrate 21) .

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art to modify the combination of Morikawa and Setlak, by specifically providing claimed "wherein the sensors are formed on an insulating substrate having transmittance, a protection insulating film is formed on a side opposite to the insulating substrate of the sensors, and the interlayer insulating film includes the protection insulating film and the gate insulating film", for the purpose of allowing light to enter the photosensor and to insulate the different component of the photosensor.

Regarding **claim 24**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 23. In addition, Morikawa discloses: wherein a transparent conducive film is formed on the protection insulating film, and the first detection electrode is the transparent conductive film (see paragraph 276 and figure 38, wherein the electrostatic discharging and contact sensing electrode 31 is an optically transparent electrode formed on a photosensor, wherein electrode 31 is made of electrodes 31a and 31b, wherein electrode 31a is the first detection electrode).

Regarding **claim 25**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 22. In addition, while the combination fails to specifically disclose the limitations of claim 25, the examiner maintains that it would have been obvious to provide:
wherein the counter electrode is the drain electrode, and the first signal voltage applied to the counter electrode by the signal voltage applying circuit is pulse voltage applied to

the drain electrode (see Morikawa paragraph 119 and figure 3, wherein a voltage pulse is applied to the drain electrode through the drain line, wherein in light of the discussion above in regards to the counter electrode opposite the first detection electrode, wherein the counter electrode excites signals onto the first detection electrode, it would have been obvious that the drain electrode also would have excited signals onto the detection electrode 31, and even further supported in the embodiment of Morikawa in figure 47, wherein only the electrode 31a is on top of the sensors and thus only electrode 31a, the first detection electrode, would be excited).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Morikawa by specifically providing "wherein the counter electrode is the drain electrode, and the first signal voltage applied to the counter electrode by the signal voltage applying circuit is pulse voltage applied to the drain electrode", as taught by Morikawa and Setlak, for the purpose of having a functional method of controlling the photosensors.

Regarding **claim 26**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 25. In addition, Morikawa discloses: wherein the pulse voltage is the precharge pulse (see paragraph 119 and figure 3, wherein φpg is the precharge signal, and as can be seen in figure 3 is a pulse).

Regarding **claim 27**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 22. In addition, while the combination

fails to specifically disclose the limitations of claim 27, the examiner maintains that it would have been obvious to provide:

wherein the sensor array includes a plurality of drain lines connected to the drain electrode of the photosensors (see paragraph 256 and figure 38, wherein drain electrodes 27a and 27c are projected from the common drain line 103);

the counter electrode is the drain electrode and the drain line, and the first signal voltage applied to the counter electrode by the signal voltage applying circuit is pulse voltage applied to the drain line (see Morikawa paragraph 119 and figure 3, wherein a voltage pulse is applied to the drain electrode through the drain line, wherein in light of the discussion above in regards to the counter electrode opposite the first detection electrode, wherein the counter electrode excites signals onto the first detection electrode, it would have been obvious that the drain electrode also would have excited signals onto the detection electrode 31, and even further supported in the embodiment of Morikawa in figure 47, wherein only the electrode 31a is on top of the sensors and thus only electrode 31a, the first detection electrode, would be excited).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Morikawa by specifically providing "wherein the sensor array includes a plurality of drain lines connected to the drain electrode of the photosensors, the counter electrode is the drain electrode and the drain line, and the first signal voltage applied to the counter electrode by the signal voltage applying circuit is pulse voltage applied to the drain line", as taught by Morikawa

and Setlak, for the purpose of having a functional method of controlling the photosensors.

Regarding **claim 28**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 27. In addition, Morikawa discloses: wherein the pulse voltage is the precharge pulse (see paragraph 119 and figure 3, wherein φpg is the precharge signal, and as can be seen in figure 3 is a pulse).

Regarding **claim 39**, Morikawa discloses a driving method for driving an image reading apparatus including a sensor array having a detecting surface on which a detecting object is placed and drive controller which reads an image pattern of the detecting object placed on the detecting surface (see paragraph 244 and figure 43), comprising the steps of:
detecting a third signal waveform excited to the second detection electrode based on contact of the detecting object with both the first detection electrode and second detection electrode provided to be electrically insulated and spaced from the first detection electrode (see electrode 31a, a first detection electrode, and 31b, a second detection electrode, and contact detector 170 in paragraphs 276 and 281);
determining whether the detecting object brought into contact the detecting surface is a specific detecting object based on the state of the detected third signal waveform (see paragraph 281, wherein a finger between electrodes 31a and 31b is detected based on a change in the level of a detection signal out of electrode 31b);

starting reading of the image pattern by the drive controller when it is determined that the detecting object is the specific detecting object (see paragraph 281, wherein it is disclosed that the contact detector 170 outputs the photography start signal to the controller 160).

Morikawa fails to disclose "applying signal voltage having a first signal waveform that varies periodically to a counter electrode provided on an upper portion of the sensor array to be opposite to a first detection electrode having the detecting surface through an interlayer insulating film to excite a second signal waveform to the first detection electrode". However, the examiner maintains that it was obvious at the time of the invention, as taught by Setlak, to provide:

applying signal voltage having a first signal waveform that varies periodically to a counter electrode provided on an upper portion of the sensor array to be opposite to a first detection electrode having the detecting surface through an interlayer insulating film to excite a second signal waveform to the first detection electrode (see excitation drive amplifier 74 in column 6 lines 38-42, drive electrode layer 71 and sensing electrode 78 in column 6 lines 38-39, 46-48 and figure 7, and the first electric field in column 6 line 66 through column 7 line 1 and figure 8);

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Morikawa, by specifically providing "applying signal voltage having a first signal waveform that varies periodically to a counter electrode provided on an upper portion of the sensor array to be opposite to a first detection electrode having the detecting surface through an interlayer insulating film to excite a

second signal waveform to the first detection electrode", as taught by Setlak, for the purpose of obtaining an output signal that varies according to the distance between the finger and the electrode on the surface of the sensor (first detection electrode) using a capacitive voltage divider in order to prevent spoofing of the device with an object that does not have the same capacitive characteristics as finger skin (see column 7 lines 3-12).

Regarding **claim 40**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 39. Morikawa fails to specifically disclose claimed "wherein the step of determining whether the detecting object is a specific detecting object includes the step of comparing threshold value preset based on a capacitance component and a resistance component of the specific detecting object with the third signal waveform excited to the second detection electrode". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the step of determining whether the detecting object is a specific detecting object includes the step of comparing threshold value preset based on a capacitance component and a resistance component of the specific detecting object with the third signal waveform excited to the second detection electrode (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in impedance resulting from the resistance value or capacity value by the human body including the finger, wherein this change is

determined from a change in the level of the detection signal, wherein it would be obvious to one of ordinary skill in the art that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein since Morikawa discloses that a change in impedance based on the resistance value or capacity value of the finger is detected, it would be obvious that the reference threshold value is based on this resistance value or capacity value).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the step of determining whether the detecting object is a specific detecting object includes the step of comparing threshold value preset based on a capacitance component and a resistance component of the specific detecting object with the third signal waveform excited to the second detection electrode", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 41**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 40. Morikawa fails to specifically disclose claimed "wherein the step of comparing the threshold voltage with the third signal waveform includes the step of determining whether the threshold voltage is included within the range of voltage amplitude of the third signal waveform, and the step of determining that the detecting object is the specific detecting object when it is determined that the threshold voltage is included within the range of voltage amplitude

of the third signal waveform". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide: wherein the contact detector determines that the detecting object is the specific wherein the step of comparing the threshold voltage with the third signal waveform includes the step of determining whether the threshold voltage is included within the range of voltage amplitude of the third signal waveform, and the step of determining that the detecting object is the specific detecting object when it is determined that the threshold voltage is included within the range of voltage amplitude of the third signal waveform (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the reference signal value and the current signal value must be at least some amount, wherein this amount would at least fall within the range of the detection signal).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the step of comparing the threshold voltage with the third signal waveform includes the step of determining whether the threshold voltage is included within the range of voltage amplitude of the third signal waveform, and the step of determining that the detecting object is the specific detecting object when it is determined that the threshold voltage is included within the range of voltage amplitude

of the third signal waveform", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 42**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 40. Morikawa fails to specifically disclose claimed "wherein the step of comparing the threshold voltage with the third signal waveform includes the step of detecting whether the third signal waveform has passed the threshold voltage level, and the step of determining that the detecting object is the specific detecting object when the number of times the third signal waveform has passed the threshold voltage level is counted and the number of continuous count times exceeds the preset number of times". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the step of comparing the threshold voltage with the third signal waveform includes the step of detecting whether the third signal waveform has passed the threshold voltage level (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the reference signal value and the current signal value must be at least some amount);

the step of determining that the detecting object is the specific detecting object when the number of times the third signal waveform has passed the threshold voltage level is counted and the number of continuous count times exceeds the preset number of times (see paragraph 281, wherein since the contact detection 170 detects when a change in the level of the detection signal occurs, in order to detected that a finger has come into contact with the electrode 31, the contact detector 170 outputs the photography start signal to the controller 160, the contact detector necessarily detects at least 1 occurrence of a change in signal level)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the step of comparing the threshold voltage with the third signal waveform includes the step of detecting whether the third signal waveform has passed the threshold voltage level, and the step of determining that the detecting object is the specific detecting object when the number of times the third signal waveform has passed the threshold voltage level is counted and the number of continuous count times exceeds the preset number of times", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 43**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 40. Morikawa fails to specifically disclose claimed "wherein the threshold voltage is set to voltage higher than the upper limit value of the third signal waveform excited to the second detection electrode in a

state that at least the detecting object comes in no contact with the detecting surface". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the threshold voltage is set to voltage higher than the upper limit value of the third signal waveform excited to the second detection electrode in a state that at least the detecting object comes in no contact with the detecting surface (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the reference signal value and the current signal value must be at least some amount, wherein it would be obvious that in order to determine between the two cases of finger presence and no finger presence, the difference from the threshold must be greater than the maximum signal value when no finger is present).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the threshold voltage is set to voltage higher than the upper limit value of the third signal waveform excited to the second detection electrode in a state that at least the detecting object comes in no contact with the detecting surface", for the purpose of determining that a finger is between electrodes 31a and 31b.

Regarding **claim 44**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 40. Morikawa fails to specifically disclose claimed "wherein the threshold voltage is set to voltage lower than the lower limit value of the third signal waveform excited to the second detection electrode in a state that at least the detecting object comes in no contact with the detecting surface". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:

wherein the threshold voltage is set to voltage lower than the lower limit value of the third signal waveform excited to the second detection electrode in a state that at least the detecting object comes in no contact with the detecting surface (see paragraph 281 wherein it is disclosed that the contact detector 170 detects that a finger is between electrodes 31a and 31b from a change in the level of the detection signal, wherein it would be obvious that in order to calculate a change in the detection signal, a reference threshold signal value would be needed to compare to, wherein it would be obvious that a difference between the reference signal value and the current signal value must be at least some amount, wherein it would be obvious that in order to determine between the two cases of finger presence and no finger presence, the difference from the threshold must be greater than the minimum signal value when no finger is present).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Morikawa and Setlak, by specifically providing "wherein the threshold voltage is set to voltage lower than the lower limit value of the third signal waveform excited to the second detection electrode in a state that at

least the detecting object comes in no contact with the detecting surface", for the purpose of determining that a finger is between electrodes 31a and 31b.

17. *Claims 29-37* are rejected under 35 U.S.C. 103(a) as being unpatentable over Morikawa in view of Setlak, and further in view of Iihama (US Patent Application Publication 2002/0014530), hereinafter referenced as Iihama.

Regarding **claim 29**, the combination of Morikawa and Setlak discloses everything as applied above in regards to claim 1. However, the combination fails to disclose claimed "wherein a time constant, which is defined by a resistance component between the detecting surface and the ground potential and a capacitance component added to the detecting surface, is set to 0.3 u sec or a smaller value". However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, as taught by Iihama, to provide:
wherein a time constant, which is defined by a resistance component between the detecting surface and the ground potential and a capacitance component added to the detecting surface, is set to 0.3 u sec or a smaller value (see Setlak column 7 lines 16-22, wherein it is disclosed that the sensing elements may be .002 inches in diameter which is equal to 5.08×10^{-5} meters, which provides for an area A of 8.1×10^{-9} m^2, and it is also disclosed that the distance d between drive electrode layer 71 and the sensor electrode 78 is 1×10^{-6} meters, wherein Morikawa discloses in paragraph 134 that the insulating film is made of silicon nitride, wherein, silicon nitride is known to have a dielectric constant ε_r of 6.5, as can be seen in the citation of pertinent art in regards to

Ma, wherein thus the capacitance between the drive electrode and sensing electrode can be calculated to be 0.47 nF since $C=\varepsilon_r \varepsilon_o (A/d)$, and ε_o is a constant known to be $8.854x10^{-12}$ F/m. Further, Iihama discloses in paragraph 83 that in order to release satisfactorily the static electricity charged in the finger FN in contact with the static electricity protection conductive layer 23, the drawing wire 24 is determined to allow the wiring resistance 24a to be about 30 ohms or less, wherein Iihama shows in figure 16 that this lead wire connects the conductive layer 23 to ground, wherein even taking the highest suggested by Iihana, 30 ohms, would result in a time constant $\tau = R \times C = 14.1$ n sec = 0.0141 u sec).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify Morikawa, by specifically providing "wherein a time constant, which is defined by a resistance component between the detecting surface and the ground potential and a capacitance component added to the detecting surface, is set to 0.3 u sec or a smaller value", as taught by Iihana, for the purpose of satisfactorily releasing the static electricity charged in the finger in contact with the static electricity protection conductive layer.

Regarding **claim 30**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 29. In addition, Morikiawa discloses: wherein the resistance component includes electrical resistance of the first detection electrode (see paragraph 276, wherein it is disclosed that electrode 31a is made of indium tin oxide, which inherently has a resistance associated with it).

Regarding **claim 31**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 29. In addition, the combination discloses:

wherein the capacitance component includes electrostatic capacitance between the first detection electrode and the counter electrode opposed through the interlayer insulating film and between the first detection electrode and the sensor (see Setlak column 7 lines 3-12 and figures 8 and 9, wherein a capacitance it disclosed between the sensing electrode 78 and the excitation electrode 71. In addition, the detection electrode 31a and the sensor in Morikawa will inherently have a capacitance between them since they are two conductors spaced apart by insulation).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify Morikawa, by specifically providing " wherein the capacitance component includes electrostatic capacitance between the first detection electrode and the counter electrode opposed through the interlayer insulating film and between the first detection electrode and the sensor", as taught by Setlak, for the purpose of having an electrode opposite the sensing electrode to have an additional protection against fingerprint spoofing, as also discussed in claims above.

Regarding **claim 32**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 29. In addition, the combination discloses:

wherein the time constant is set to 0.25 u sec or a smaller value (see Setlak column 7 lines 16-22, wherein it is disclosed that the sensing elements may be .002 inches in diameter which is equal to 5.08×10^{-5} meters, which provides for an area A of 8.1×10^{-9} m^2, and it is also disclosed that the distance d between drive electrode layer 71 and the sensor electrode 78 is 1×10^{-6} meters, wherein Morikawa discloses in paragraph 134 that the insulating film is made of silicon nitride, wherein, silicon nitride is known to have a dielectric constant ε_r of 6.5, as can be seen in the citation of pertinent art in regards to Ma, wherein thus the capacitance between the drive electrode and sensing electrode can be calculated to be 0.47 nF since $C=\varepsilon_r \varepsilon_o (A/d)$, and ε_o is a constant known to be $8.854x10^{-12}$ F/m. Further, Iihama discloses in paragraph 83 that in order to release satisfactorily the static electricity charged in the finger FN in contact with the static electricity protection conductive layer 23, the drawing wire 24 is determined to allow the wiring resistance 24a to be about 30 ohms or less, wherein Iihama shows in figure 16 that this lead wire connects the conductive layer 23 to ground, wherein even taking the highest suggested by Iihana, 30 ohms, would result in a time constant $\tau = R \times C = 14.1$ n sec = 0.0141 u sec).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify Morikawa, by specifically providing "wherein a time constant, which is defined by a resistance component

between the detecting surface and the ground potential and a capacitance component added to the detecting surface, is set to 0.3 u sec or a smaller value", as taught by Iihana, for the purpose of satisfactorily releasing the static electricity charged in the finger in contact with the static electricity protection conductive layer.

Regarding **claim 33**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 29. In addition, the combination discloses:

wherein the resistance component is set to 30 Ω or a smaller value (see Iihama paragraph 83 wherein in order to release satisfactorily the static electricity charged in the finger FN in contact with the static electricity protection conductive layer 23, the drawing wire 24 is determined to allow the wiring resistance 24a to be about 30 ohms or less).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify Morikawa, by specifically providing "wherein the resistance component is set to 30 Ω or a smaller value", as taught by Iihana, for the purpose of satisfactorily releasing the static electricity charged in the finger in contact with the static electricity protection conductive layer.

Regarding **claim 34**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 29. In addition, the combination discloses:

wherein the capacitance component is set to 10 nF or a smaller capacitance value (see Setlak column 7 lines 16-22, wherein it is disclosed that the sensing elements may be .002 inches in diameter which is equal to 5.08×10^{-5} meters, which provides for an area A of 8.1×10^{-9} m^2, and it is also disclosed that the distance d between drive electrode layer 71 and the sensor electrode 78 is 1×10^{-6} meters, wherein Morikawa discloses in paragraph 134 that the insulating film is made of silicon nitride, wherein, silicon nitride is known to have a dielectric constant ε_r of 6.5, as can be seen in the citation of pertinent art in regards to Ma, wherein thus the capacitance between the drive electrode and sensing electrode can be calculated to be 0.47 nF since $C=\varepsilon_r \varepsilon_o (A/d)$, and ε_o is a constant known to be $8.854x10^{-12}$ F/m).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify Morikawa, by specifically providing "wherein a time constant, which is defined by a resistance component between the detecting surface and the ground potential and a capacitance component added to the detecting surface, is set to 0.3 u sec or a smaller value", as taught by Iihana, for the purpose of having an electrode opposite the sensing electrode to have an additional protection against fingerprint spoofing, as also discussed in claims above.

Regarding **claim 35**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 29. In addition, Morikawa discloses: wherein each sensor of the sensor array is a photosensor and has a predetermined light receiving surface (see paragraphs 245-246);

the first detection electrode has an area larger than the area of the light receiving surface (see paragraph 286 and figure 47);
the first detection electrode is a transparent electrode film formed on the upper portion of the light receiving surface of the sensor array through the interlayer insulating film (see paragraph 276 in regards to electrode 31a made of indium tin oxide).

Regarding **claim 36**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 35. The combination fails to specifically disclose claimed the limitations of claim 36. However, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to provide:
wherein conductive member having a resistance value lower than a resistance value of the transparent conductive film is provided to be electrically connected to an area besides an area corresponding to at least the light receiving surface of the transparent conductive film (see paragraph 277 wherein electrode 31b is connected with a wire to ground so that the electrostatic electricity is discharged to the ground, wherein it would be obvious to one of ordinary skill in the art to make this resistance smaller then the resistance associated with electrode 31a so that the electrostatic electricity travels along the wire out of electrode 31b).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify Morikawa, by specifically providing "wherein conductive member having a resistance value lower than a

resistance value of the transparent conductive film is provided to be electrically connected to an area besides an area corresponding to at least the light receiving surface of the transparent conductive film", for the purpose of having electrostatic electricity discharged to ground.

Regarding **claim 37**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 36. In addition, Morikiawa discloses: wherein the resistance component includes electrical resistance formed by the transparent conductive film and the conductive member (see paragraph 276, wherein it is disclosed that electrode 31a and electrode 31b are made of a transparent conductive film indium tin oxide, which inherently has a resistance associated with it).

18. *Claim 38* is rejected under 35 U.S.C. 103(a) as being unpatentable over Morikawa in view of Setlak, and further in view of Iihama, and even further in view of Manchanda et al. (US Patent 6,240,199), hereinafter referenced as Manchanda.

Regarding **claim 38**, the combination of Morikawa, Setlak, and Iihama discloses everything as applied above in regards to claim 36. However, the combination fails to disclose claimed "wherein the conductive member is formed of any one of conductive materials of chromium, aluminum, alloy material containing chromium, and alloy material containing aluminum". However, the examiner maintains that it would have been obvious at the time of the invention, in view of Manchanda, to provide:

wherein the conductive member is formed of any one of conductive materials of chromium, aluminum, alloy material containing chromium, and alloy material containing aluminum (see Manchanda column 3 line 67 through column 4 line 3, wherein it is disclosed that aluminum is often used in sensors because of its low resistance, wherein it would have been obvious to desire a low resistance material for electrode 31b since it was disclosed in Iihama and discussed above that a low resistance is needed to have the electrostatic electricity go to ground).

Therefore, the examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Morikawa by specifically providing "wherein the conductive member is formed of any one of conductive materials of chromium, aluminum, alloy material containing chromium, and alloy material containing aluminum", as taught by Manchanda, for the purpose of having a low resistance electrode in order to ground the electrostatic electricity.

Citation of Pertinent Prior Art

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Ma (IEEE Transactions on Electron Devices, Vol 45, No 3, Making Silicon Nitride Film a Viable Gate Dielectric), is cited to reference as accepted value of the dielectric constant of silicon nitride in page 685.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL ZEILBERGER whose telephone number is (571)270-3570. The examiner can normally be reached on M-F 7:30-5pm est (alternate Fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571)272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Daniel Zeilberger
Examiner
Art Unit 2624

2/15/08

DZ
02/15/08

VIKKRAM BALI
PRIMARY EXAMINER